DECEMBER, 1960

# THE AIR LINE PILOT

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THE AIR LINE PILOT

DECEMBER, 1960

Vol. 29, No. 12

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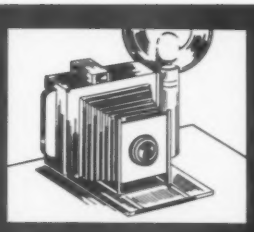
## On The Cover

*Cover photograph, O'Hare airport control tower—Metro News Photo*

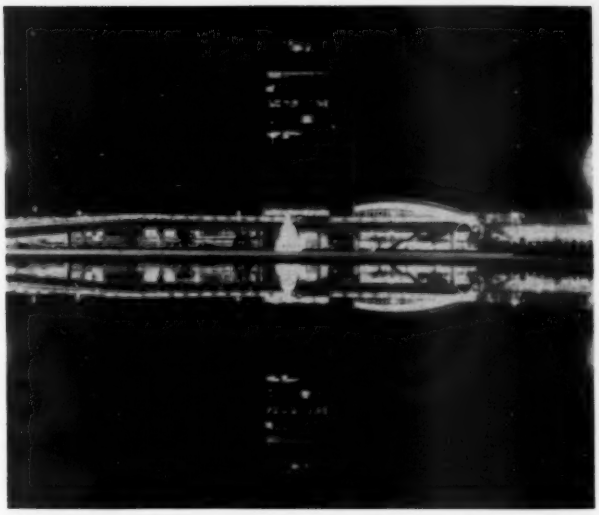
A series of air line disasters in recent years has brought the problem of air traffic control into sharp focus. In the skies today are aircraft with speeds as low as 100 m.p.h. and speeds as high as 2,000 m.p.h. Added to this is the congestion of air traffic above major cities. Creating a safe, modern system is a major problem. In this issue of *The Air Line Pilot* and in future issues, we shall publish articles by experts in this field — men who have given time and thought to every aspect of the problem.



# The ALPA Camera

Some Highlights and Sidelights of the News and ALPA in Pictures

U.P.I. Newspicture



*One of the reflecting pools at Idlewild created this science fiction type of pattern of the control tower.*

U.P.I. Newspicture

*Knight flight — a suit of armor went via National Airlines from Miami to a Mexico City museum. Flight bag is for "spare parts."*

United Air Lines Photo

*Three jet engine Boeing 727 ordered by UAL for delivery in 1963. The 550-600 m.p.h. aircraft will provide short-to-medium range service.*

*LEFT — Two blind Chicago school boys were among the 20 blind children who got their first plane ride in a TWA Convair 880 over Chicago as guests of the line.*

*BELOW — Civil Aeronautics Board meeting of investigators of the two plane collision over New York, December 16. Representatives of ALPA are assigned to the investigation.*

U.P.I. Newspicture

U.P.I. Telephoto

U.P.I. Photograph

*Four days after the author's warning on inadequate air traffic control systems, this tragedy occurred above New York, December 16, 1960.*

***The critical problem facing aviation is***

# AN URGENT NEED FOR CLEAR

By FRANCIS M. McDERMOTT
*Executive Director*
*Air Traffic Control Association*

WHAT is one of the most critical problems facing the aviation industry today? It is simply this: The lack of an effective plan for a complete *system* of air traffic control. Our Congress recognized this deplorable situation in 1957 and passed the Airways Modernization Act as the first step in doing something about it. In 1958, Congress passed the Federal Aviation Act, which was supposed to provide the environment and mechanism to devise and implement a plan for an effective traffic control *system*. Despite three years of effort, and comparatively abundance of appropriated funds, we still are as far removed from an effective plan, as we were in 1957.

**Defining the Problem**

Before a problem can be solved, it must, of course, be understood. Before it can be understood, *the problem must be clearly stated*. The problem of air traffic control has never been clearly stated, yet few subjects have been treated in such voluminous detail, by such a wide assortment of talent. Every attempt thus far to analyze the problem has fallen short because of this one deficiency—there has never been a clear statement of the operational requirements for an effective air traffic control *system*.

Unfortunately, "operational requirements" is a term that has come to mean different things to different people. However, for our purpose here, let's agree to a definition of operational requirements which embraces a fundamental statement of the over-all problem of air traffic control. We must start with a clear understanding of what the controller and the pilot are required to do—the tools each need to function in the system, and the procedures to make these tools effective—and we must insure that each tool provided is an integral part of the system—that the "black boxes" are designed to talk to each other.

I repeat, the ATC problem has never been adequately stated. Certainly the scholarly comparisons of ATC to a three-dimensional chess game have not helped for a better understanding. Controllers find they are not allotted the same amount of time to cogitate on their "moves"—and the consequences of a bad "move" in ATC, are a bit more deadly.

A noted air line pilot and authority on air traffic control, Capt. J. D. Smith, Chairman of the ALPA Air Traffic Control Committee, writing in the October issue of *The Air Line Pilot*, expressed it in this manner: "The Association (ALPA) over many years has advocated that air traffic control must stretch from the ramp of departure to the ramp of arrival. The basis for this position is the recognition that a safe and expeditious traffic flow can only be maintained by making available proper equipment, procedures, techniques and design to be applied to the entire time an aircraft is moving, either in the air or on the ground." In his summary Captain Smith concluded: ". . . we need (1) a procedure to properly determine what is needed; (2) how the facilities are implemented; (3) and how they shall be paid for. Unfortunately, there are no answers to any of the three points."

An effective air traffic control system is the life blood of the aviation industry. Our aviation industry daily becomes more and more dependent upon the safe handling of its airborne investment. Every month, millions of passengers ride the air lines with complete assurance that they will reach their destination in safety—not necessarily "on time," but safely. It matters little whether they, the passengers, fully appreciate the fact that they may be hurtling through the air at such a speed that the pilot could not take evasive action should he detect a head-on aircraft. The pilot knows this, and as indicated by the previous reference to Captain Smith, the Air Line Pilots Association has been one of the strongest advocates of an effective air traffic control system.

The Defense Department too, knows the important role ATC plays in our scheme of national defense. The take-off and return of interceptors, particularly around heavily congested areas; the round-the-clock training missions; and the ever alert posture of our retaliatory forces, place a heavy demand upon ATC. And about to be awakened is the "sleeping giant," or so, many have chosen to name the air freight phase of the industry. It is only a matter of time before air freight rates can be offered in competition to surface rates.

We can then anticipate an explosive growth in air transportation—with resultant demands on air traffic control such as we have never imagined. Tragic indeed would be the thought of this new industry, finally reaching a point where it could function with a slim margin of profit, throttled by expensive delays from an already overtaxed air traffic control service.

*This article is based on a speech made by Mr. McDermott before a joint meeting of the Kansas City Section of the American Society of Mechanical Engineers and the Kansas City Section of the American Institute of Electrical Engineers, Kansas City, Mo., Dec. 12, 1960.*

# LE AD'ERATIONAL REQUIREMENTS

*Metro Photograph*

**Solution Is Lagging**

The other day I heard a man cite a current Pentagon expression: "The solution will overtake the problem." Not being completely checked out on Pentagon parlance, I'm not sure that I appreciate the full significance of that statement—but this much is clear—the solution to the air traffic control problem is lagging *further behind* the problem now, than it was five years ago—and there is little prospect in the near future of closing the gap. Until we can put together a clear statement of the problem, in terms of the basic operational requirements, the gap will increase. It is in this endeavor that I ask the help of all who design, build, install and maintain electronic and mechanical aids to air navigation and air traffic control.

You may logically ask, what about the Curtis Committee, and its System Engineering Team? What about the Airways Modernization Board? and, What about the Federal Aviation Agency? You could as easily ask about the dozens of additional groups that have dabbled in air traffic control over the past twenty years. The answer to all such questions is the same—there has never been a clear statement of the operational requirements for an effective air traffic control system.

Until we take this fundamental step, the development of air traffic control will continue to be little more than "topsy-like"—a hodge-podge of electronic black boxes, adapted to, rather than designed for, air traffic control.

In 1958, General Quesada, then Chairman of the Airways Modernization Board, addressing the National Security Industrial Association, said: "I should like to mention parenthetically that at the AMB, where we are engaged in obtaining the rapid development of a new air traffic control and navigation system, a process closely akin to weapons development, we are attempting to insist on contractor performance in accordance with his promises." While urging industry to expand its company-sponsored research and development; revise its management techniques for cost estimating, budgeting and control; and respond to the increased incentives and rewards that accrue to the contractor with a good performance record — Quesada admitted that profound changes are also indicated in the policies, actions, and attitudes of the government.

**What Are Objectives?**

When engineers are asked to build the better mousetrap, or to automate all functions of the largest steel mill in the country—they don't undertake the job without a clear understanding of how the function is presently performed, and how it is intended to be accomplished. Now I will admit, in this competitive society, companies will often bid for a contract, even though the requirements have not been clearly stated—sometimes they are the successful bidders! But the results are always far more satisfactory, to all parties concerned, if there is a clear understanding of requirements, prior to undertaking development and fabrication.

How many of you have worked on projects in which you actually had little confidence? Americans traditionally abhor waste—and there is hardly an area that compares with research and development in the cost of wastefulness.

In the case of air traffic control, the government is spending fifty times more than it did five years ago on air traffic control research. We are hard pressed to find anything like a comparable return in results. The reason?—a lack of a clear statement of the operational requirements. The gap between the "solution" and the "problem" is increasing. And let us not forget, that it is the "problem" that is leading! The result? Many skilled and competent individuals and companies, are spending a lot of time and money on studies and devices that have not been clearly identified as a necessary part of the system solution.

Let's look at a few segments. First, automation. Automation has been seized as the panacea. The word "automation" has been mentioned in so many press releases that it has effectively hypnotized the flying public into believing that it is only a matter of a short period of time before all air traffic control problems are solved. Engineers know that you can, and actually have, automated the most complex types of assembly lines, with literally thousands of intricate operations being performed automatically and with precision. Mechanical engineers and electrical engineers have combined their talents to produce an automatic system, with such a high degree of reliability that it can dispense with the services of all but a skeleton crew of trouble shooters.

Why then, can't we apply these known techniques to an automatic system of air traffic control? One rather significant difference, of course, lies in a consideration of just what happens when trouble does develop in the "system." In the case of the automated assembly

*Continued on next page*

**WHAT THIS ARTICLE IS ABOUT**

**By defining the operational requirements for a modern air traffic control system, says the author, only then will it be possible to develop a complete and safe system. Solution to the problem, according to the author, has been delayed by failure to define research objectives. This in turn places a handicap on the development of new equipment and techniques. Equipment designers are only working on partial solutions to the problem; there is reason to believe much of their efforts are concentrated on stopgap measures. The jet age is out-running air traffic control facilities. The author calls for clear thinking to define the necessary operational requirements for a modern, integrated air traffic control system to meet the growing needs of jet age aviation.**

## An Urgent Need For Clear Operational Requirements (Cont'd)

line, one handy little law of nature comes into play—gravity. The "line" shuts down, and perhaps trouble lights appear to guide the maintenance man to the source of difficulty. Each element of the system remains neatly in its place, until the trouble is corrected, and operation may be resumed. Every variable in the system can be predicted and catalogued. Not so with the air traffic control system! Effective air traffic control requires *decision making*, and this function can never be relegated to a machine!

**Machine-made Decisions?**

In a recent talk entitled "Man in Space," Capt. G. P. Phoebus, a Naval authority on space medicine, said, "It is factually not feasible to anticipate and program all possible alternative situations into automatic systems." There are an *infinite* number of alternative situations in our air traffic control system.

In commenting further on the role of man, Phoebus said, "Man takes advantage of time, redundency, and sequential dependencies and thus profits from his experiences. He shows originality in discovering and putting to use data and intelligence gathered incidental to the mission. He is flexible, can improvise, re-program and even change performance tolerances. He can tolerate temporary overloads without disruption, and can select and filter inputs. He is capable of inductive reasoning, of setting up and verifying generalizing hypotheses. He can find and identify signals in a wide variety of noise patterns and spectra. He is harder to jam than automatic equipment. All of this, and much more, is man!"

In our search then, for a clear statement of operational requirements for an effective air traffic control system, we must begin with this basic premise: Decision making by humans is essential, and this includes the controller on the ground as well as the pilot in the air.

Any consideration of the infinite number of variables and alternative situations in air traffic control must take cognizance of the fascinating studies in collision avoidance now underway. These studies and experiments range all the way from some very good work being done in the field of conspicuity—lights, paints, and better cockpit visibility, and this is worthwhile effort indeed. Certainly we will always have a large element of aviation that has no desire, nor no need, to rely on the strict regulations of air traffic control. The safety of this phase of aviation can be considerably enhanced through the improvements in aircraft conspicuity.

A more sophisticated approach, proposes the development of systems of proximity warning by infra-red or electronic detection, feeding into airborne computers coupled to auto-pilots controlling evasive action required.

The latter approach, to give to aircraft the collision avoidance capabilities of a flock of bats, is not sound, and efforts toward this end are not likely to contribute toward a safe and efficient system of air traffic control. Again, it is not our intent to find fault with the well-intentioned inventors and manufacturers that operate in this field. The fault lies with all of us—for failing to clearly state the problem, and define the operational requirements.

Perhaps the day will come when the need for humans to travel from place to place will have passed. Loved ones will be able to visit by closed circuit television, in color, of course. A United Nations session may consist of a roundtable of transistorized computers, programmed to provide the precise amount of give and take, in reaching fundamental world decisions for the good of "humanity." Indeed, an electronic newspaper reporter could simultaneously cover the diverse activities of an entire city, baseball, opera, politics, etc., simply by plugging in the proper inputs.

However, until the day that the passenger manifest of an air line is simply a list of electronic "black boxes," and so long as humans have the need to travel by air, we can settle for nothing less than 100 per cent reliability in our air traffic control system. To achieve this reliability we need the judgment of humans—controllers on the ground and pilots in the air. I can't think of a better way to illustrate this point, than to call attention to a book published last November by Doubleday and Company, entitled *The Probable Cause*. Written by capable United Press International reporter, Robert J. Serling, it is a story about air crashes—some that happened, and some that might have happened. This book dramatically brings out the tragic consequences of over-reliance upon mechanical and electronic devices, in a system that is perhaps a few shades more complex than an automated assembly line.

**Developments Slow**

Changes in air traffic control equipment have always come about slowly. The government has, until recently, been seriously hindered by a lack of funds, both for development as well as for actual implementation. Airlines, and other aircraft operators have been reluctant to add airborne equipment until they could be convinced that the tremendous costs of retrofit and maintenance, and the continuing expense of displaced payload, could be justified.

Look at the history of distance measuring equipment (DME), as an example. In the air traffic control operation of a few years ago, aircraft position was determined by reference to time over ground navigational aids, or sometimes, by airborne reference to the intersection of "legs" or "beams" from two ground aids. In this operation, the minimum allowable longitudinal separation was ten minutes. If an aircraft flying between two such reporting points desired to climb or descend through the altitude of an opposite bound aircraft, this change could not be permitted until ten minutes after the aircraft had been estimated to have passed each other; or, in other words were separated by at least twenty minutes flying time. For two slow-flying DC-3's, this could easily mean a separation of at least sixty miles! Obviously, the capability of a pilot to state accurately his position, mile by mile, while enroute between two navigational aids, would have permitted the compression of safe standards of separation, and allowed better utilization of airspace.

Although the Civil Aeronautics Administration has for many years maintained extensive installations of ground-based distance measuring equipment, aircraft operators did not secure the airborne units; partly because of the expense, but principally because the operational requirements had not been specified. Indeed, it was not until last year, and after resolving the TACAN-VOR controversy, that the Federal Aviation Agency announced procedures for the utilization of distance measuring information in providing separation between aircraft. Only then did airborne DME equipment begin to appear in any quantity.

We need only look at the conglomeration of ground and airborne equipment to realize just how far we are from achieving anything resembling a "system" of air traffic control. Radar has truly been a godsend to air traffic control. Yet the best we have been able to do is provide the controller with

*Continued on page*

## Sound Recording Devices For Cockpits Now Possible

The recommendation of the Air Line Pilots Association that sound recording devices be installed in air line aircraft as an aid in pin-pointing causes of air line disasters, has been demonstrated to be technically feasible. According to a report issued by the FAA, January 13, 1961, crew conversations in transport type aircraft can be recorded.

The FAA tests were confined to recording cockpit conversation. The Air Line Pilots Association Board of Directors at its Biennial Meeting, November, 1960, made recommendations that recording devices also be strategically located in cabin areas.

James L. Anast, Director of the Bureau, said that results of the tests clearly indicated that voice recordings could be effectively made with the use of a special filter at variable distances.

"The recording of crew conversations in transport aircraft is feasible and development of special circuits and equipment for this application is recommended," Mr. Anast said.

A report prepared on the experiment in which three FAA aircraft were utilized concludes that "an area pickup microphone with a cardioid pattern" will serve as a satisfactory device for recording crew conversations.

The report goes on to state that "sophisticated mounting techniques" are not considered a requirement for mounting the area pickup-type microphone in a cockpit of aircraft.

The tests proved to the contrary that when a microphone is mounted on the instrument panel of an aircraft, adequate protection is afforded by the panel shock and vibration isolators.

The report further cites that the intelligibility of the recorded crew conversations is improved appreciably by the application of electronic noise filtering.

In making known the results of the tests to determine the most desirable method for recording crew conversations as an aid to probing accidents, Mr. Anast pointed out that currently available area and individual pickup-type microphones were employed.

In addition, he added, the application of electronic noise-filtering and noise-canceling techniques were investigated for improving the intelligibility of the recorded voice. Copies of the illustrated report will be made available to air carriers and other aviation officials as soon as they are printed by the Government.

## Create Lear Safety Award

An annual award for the most significant achievement in the field of air traffic safety has been created by William P. Lear, founder and Chairman of the Board of Lear Incorporated.

The award will be given to honor the person, persons, or organization in the United States or foreign countries making the most lasting contributions to air safety.

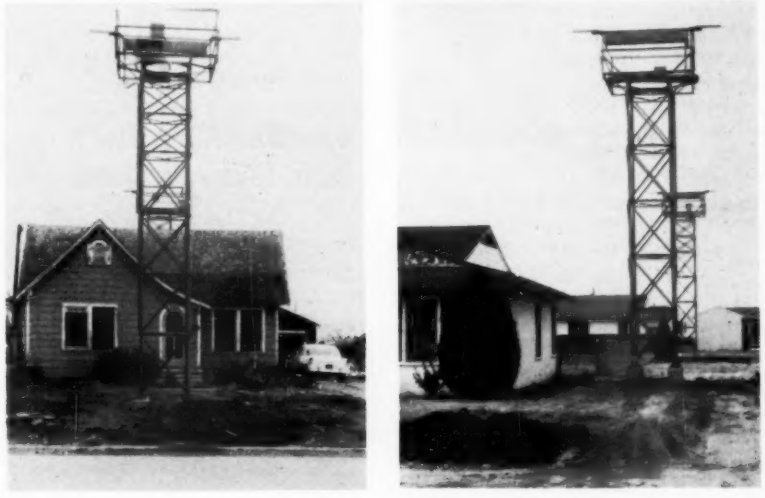
An independent award committee, made up of aviation writers and officials of technical aviation societies and non-profit organizations in the air transport field is being formed and the award will be presented first in 1962, based on the award committee's decision after monitoring air traffic safety achievements during this year.

## UAL's 1960 Jet Traffic Up

Approximately 60 per cent of United Air Lines total available passenger capacity was jet operated at the end of 1960, according to recent report by that company.

United's operating revenues were 15 per cent above 1959 and reached their highest peak in 1960. Operating expenses were $363,654,000 as against $308,327,000 in the previous year.

## LOVE FIELD GETS CENTERLINE LIGHTING



The Air Line Pilots Association recently waged a determined campaign to obtain needed improvements at Dallas' Love Field, the primary objective being replacement of Love's antiquated left-side approach system.

The pilots' objections stirred the citizens to action, then the airport authorities and finally the FAA. When the dust settled the FAA which had denied a previous request for funds to install the ALPA Centerline System at Love because the city did not provide or maintain enough clear zone areas, agreed to allocate funds for installation of a centerline system.

All preliminary steps have been completed and construction of the new system is progressing according to scheduled estimates calling for completion this summer. This move will undoubtedly add to safe operations into Love—but many of the problems associated with it could have been avoided by adequate advance planning and zoning.

The city fathers in order to get FAA funds to build the system, had to purchase some 350 additional feet around the airport. This "reclaiming" project was completed successfully and all's well even for those people who own homes in the general area where the above pictures were taken.

## Piedmont Airlines Promote Capts. Tadlock And McNames

Piedmont Airlines recently promoted Captain W. O. "Jack" Tadlock to director of flight operations, and Captain L. W. "Mac" McNames to director of flight standards.

*Captain Tadlock*

Captain Tadlock, who had served as check pilot, is in charge of all flight activities, including flight control. He has served in numerous capacities in ALPA activities, and has served two terms as chairman of Piedmont Council No. 120.

*Captain McNames*

Captain McNames has been assistant chief pilot for several years, and in his new position will be responsible for training and proficiency standards of all flight personnel. This will include all transition, flight checks, up-grading, etc.

Captain McNames was the first chairman of Council No. 120. Both pilots have been based in Winston-Salem, North Carolina, since 1947.

## ALPA Efforts Bring Fire Equipment To Cincinnati

Efforts by the Air Line Pilots Association to induce airport officials at the Greater Cincinnati Airport to provide adequate fire protection bore fruit recently with the announcement that the airport will augment its professional fire-fighting staff and will purchase new equipment early in 1961.

Owen H. Saunders, airport manager, stated that the county airport board had made the following provisions in its 1961 budget:

- Immediate hiring of four, new, full-time firemen. There is only one at present.
- Purchase of a four-wheel drive pickup truck which will carry equipment capable of dispensing 1,000 pounds of dry chemical.
- Stepped-up training schedule for more than 150 volunteer firemen as well as refresher courses for key personnel of three community fire departments on call for emergencies.
- Additional efforts will be made to obtain a foam-producing truck and a supplemental truck capable of providing extra water to replenish the foam supply.

Estimated cost of the training and new equipment has been set at $20,000 for the first year.

ALPA representatives approved the intended program, citing it as "a step forward in providing greater safety to the traveling public." Representatives of ALPA met with Saunders in a series of conferences to draw up a blueprint for alleviating "immediate fire dangers" at Greater Cincinnati Airport.

Commenting on the airport's new approach to the fire menace, B. V. Hewes (DAL), Vice-chairman of ALPA's Airport Firefighting and Rescue Committee, stated: "It certainly is a pleasure to be dealing with people who are aware of the situation and are trying to do something about it."

## Canadian ALPA Elects Capt. Mills, President

Captain David Mills will assume leadership of the Canadian Air Line Pilots Association for two years beginning in 1961, succeeding J. H. Foy to the Presidency.

Born in England and raised in New Zealand, Captain Mills is a sober, dignified man who brings many years of air line experience with him to CALPA's top post. His CALPA experience embraces not only the industrial field, but the field of professional activity as well.

He has attended three IFALPA conferences as a member of the Canadian delegation. He has, as well, been present at numerous meetings of ICAO when pilot representation was required, and has participated in Canadian Department of Transport meetings on such items as flight and duty time limitations, crew complement and Dispatcher Licensing. In short, his activities have taken him into nearly all fields of CALPA activity.

Captain Mills has also been active in inter-CALPA activities since the early 50's, serving as council chairman three times, a member of negotiating committees, and two terms as a Master Executive Council Chairman.

Other officers elected at the 11th CALPA Convention included Captain D. Harland (CPA), First Vice-President; F/O C. Simpson (TCA), Treasurer, and F/O M. G. McAskill and Captain F. E. W. Smith were elected to CALPA's Directorship.

*The inaugural ceremonies of Convair 880 service from New Orleans to Baltimore and Philadelphia. (Left to right) Manley Beard, Flight Engineer J. L. Shannon, Captain Truman Outland, Stewardesses Carolyn Cul, Carol Finn, Bonnie Salomon, Marilyn Bennett and 1st Officer C. R. Branson. — Delta Air Lines Photo.*

## AN URGENT NEED . . .

*Continued from page 6*

wo-dimensional display, showing all targets within the surveillance area, without regard to altitude, and with no easy method of acquiring and retaining identification. A major improvement in radar display has been accomplished recently through utilization of television scan-conversion, which provides a bright display; but there are still too many traffic control facilities that must rely on war-surplus radar indicators of a type discarded by the Navy in 1945 as obsolete!

Secondary radar, transponders, or beacons, have served to improve the controller's display, by providing a reinforced return, and allowing for specified coding of the radar target, considerably improving the means of target identification. Yet the acquisition of this valuable tool represents a fifteen year period of fumbling—because of the lack of a clear statement of operational requirements, and a meeting of the minds as to how the equipment would be utilized. Indeed, one major air line is currently threatening to remove its airborne beacon equipment unless FAA can devise and implement procedures that will prove to the carriers satisfaction that the equipment is a worthwhile investment.

### Integration and Coordination

There is a great deal of activity toward the development of an automatic air/ground data link for air traffic control. It is proposed that this data link may serve to relay position information direct from cockpit instruments to a ground-based computer, and allow computer derived instructions to be automatically displayed to the pilot. Lacking in this development are statements of operational requirements from either the pilot or the controller.

Data links are important elements in systems where high-speed automatic communications are required. But before we take this, or any other "black box," and offer it as a solution to a *part* of the problem—let's make sure the *over-all* problem is understood—let's examine the need—and let's make sure that this "black box" can talk to the other "black boxes" in the system!

I would like to call attention to one phase of the air traffic control problem that is of particular and immediate concern to all of us. It is summed up in the term "coordination." For purposes of enroute air traffic control, the United States is carved up into areas, each under the jurisdiction of a center. As traffic has increased year by year, the numbers of controllers in a typical center have increased ten-fold. Within the center, individual areas of jurisdiction have grown smaller and smaller, creating the need for more and more coordination between individual controllers.

The process of tabulating and following the progress of flights through these center areas has become a monumental bookkeeping operation. In processing one particular flight through an area, as many as twenty control personnel may be involved. Providing accurate information as to the identity, route of flight, altitude, speed, etc., on each flight is a demanding and painstaking task, but one well suited to an electronic computer and appropriate high-speed printers.

The process of revising flight plans, and keeping each controller accurately informed as to critical changes in route, altitude, and speed, is even more demanding, and imposes a terrific burden of coordination, with time of the very essence.

A pattern of incidents is developing wherein appears that this cordination process, presently a manual operation, is breaking down. On November 5th of 1960, a B-47 and an Electra came so close to collision that the violent evasive action of the Electra caused injuries to passengers. Each aircraft was following its assigned flight path, and cruising at its assigned altitude. There had been a breakdown in coordination—not because of negligence, but because the demands of manually coordinating hundreds of changes in route, time and altitude every hour, had taken its toll.

### ATC Experiments

Controllers live in deadly fear of a mid-air collision—and believe me, they derive no comfort or solace from the fact that they are safely ensconced in a building on the ground! Air traffic control is not the only occupation that generates ulcers, and other physical and mental disorders, of course. But the incidence of such cases among a group of relatively young men is alarming. It stems partly from the need to work under pressure, for sustained periods of time, utilizing some rather poor tools and being faced with a staggering responsibility for life and property.

But probably one of the most compelling forces which motivates a controller, when he gets to be 35 or 40, to start looking around for another position, is the utter frustration of knowing that he can't keep up the pace—and the dismal hopeless feeling that there is little prospect of improving his lot in air traffic control. This frustration stems from several years of listening to platitudes and over-simplifications from well-intentioned, but ill-informed contributors.

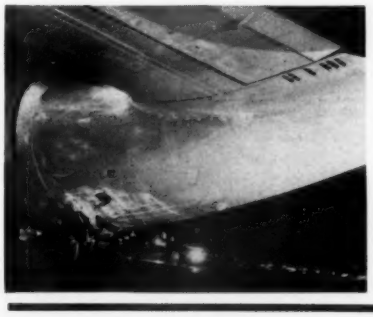
Let's take a specific example: As air traffic increased over the past several years, both in density and complexity, it became clear that the routine but highly critical bookkeeping operation involved was interfering with the increasingly important decision making function of the controller. The need to translate flight data into meaningful information, prepare it in legible form, and present it to the controllers concerned swiftly, and above all, accurately, led to the investigation of computers. Experimentation with off-the-shelf computers soon led to implementation of six ARTC centers with data processing equipment. This was the first step in automation of the air traffic control function—automation of the routine clerical function—*not* the decision making function.

With the computers came an increased assurance that the data displayed before the controller was accurate, and that when the computer displayed the altitude of 23,000 feet for a particular flight to one controller, that same information would be properly displayed to all controllers concerned with that flight. This type of equipment was selected, tested, and installed because of a firm operational requirement as specified by the controller. It has served to assure the controller that the basic flight data so necessary to his function is accurate. It has eliminated the need for a great deal of human coordination, and reduced the incidence of human error in passing information from one controller to another.

However, flight plans are subject to change. In the course of a flight between Washington, D. C., and Kansas

*Continued on page 10*

### The Menace Of Collisions



## AN URGENT NEED . . .

*Continued from page 9*

City, it may be necessary to change altitude several times. The route of flight, the highways of the air, may change. The vagaries of wind and weather in general necessitate frequent changes in estimated times of arrival at check points along the way. These changes must be calculated, plotted and passed from controller to controller, and from center to center—accurately, and without delay.

It was clear to controllers that a computer operation that could successfully analyze, compute, and distribute the original flight data to the controller could be given the added responsibility of accepting, analyzing, computing and distributing changes in that flight data. Changes in route, time altitude, etc.

As I mentioned earlier, the present air traffic control operation is experiencing frequent breakdowns in this coordinating, or updating function. Yet plans to add an updating function to the computers presently in use in ATC have been cancelled. Indeed, the addition of any more computers in ARTC centers have been deferred, pending the availability of an as yet, untested data processing system being assembled by the research department of the FAA. At best, the experimental system now being assembled will represent a delay in actual implementation of at least two years. There is some doubt that the experimental system will produce any greater capability than the six computers now in operation. This is no reflection on the manufacturers engaged in this effort. They are not responsible for the fact that their projects may not represent sound operational requirements. They are doing the very best they can, with the guidance that has been available to them.

We all recognize the vital need for research—but we must never lose sight of the equally vital need to use the tools that are available now, and use them effectively, if we are to maintain safety in air traffic control while new tools are being developed.

### Joint Effort Necessary

How do we go about correcting situations such as this? *It must be a joint effort.* The air traffic controllers have a heavy responsibility to provide a clear understanding of the ATC problem by helping to formulate a concise statement of the operational requirements. The engineers who design, construct, and install the electronic and mechani-

*Continued on page 15*

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### *An Appeal To Review All Areas Of This Problem*

# The Pilot's View Of Air Safety

by KARL M. RUPPENTHAL, *Director*
*Stanford University Transportation Management Program*

HOW QUICKLY we allow disaster to slip from memory! The Brooklyn-State Island air crash of December 16, with its death toll of 135, commanded headlines from coast to coast as the greatest air tragedy in our history. Yet, but for the misfortune that one of the planes plunged into a Brooklyn street, killing some bystanders, this crash can be accounted as no more tragic than one that took place more than four years earlier, in the summer of 1956.

Coming together on converging courses, two planes collided over the Grand Canyon of the Colorado, killing 128 passengers and crew members. Both pilots were on course operating precisely according to the rules, when the crash came. The trouble was that the rules were outdated; the old "see and be seen" concept was already anachronistic, and federal aviation officials had not seen fit to replace it. Nor had they kept equipment up to date. This busy Western airway lacked sufficient radio facilities.

For years, air line pilots had been demanding improvements in the creaking airways machinery. Now after the Grand Canyon crash, Congress belatedly took action. At that time, the Civil Aeronautics Board (CAB) made the safety regulations, and the Civil Aeronautics Authority (CAA) was responsible for enforcing them. When accidents occurred, the CAB was charged with investigating them—and here was the hitch. For the CAB, which made the rules, was not likely to blame the rules when an air crash occurred. Accident reports were frequently hedged so that they did little to point up the real causes.

In an effort to correct this situation, Congress dissolved the CAA and set up the Federal Aviation Agency (FAA), giving it unprecedented powers to establish and maintain safety and traffic rules. The CAB was left with the responsibility for investigating accidents.

From the beginning, the Air Line Pilots Association, organization of the commercial air line pilots, favored many of the changes made by Congress, and there is no doubt that in its relatively brief history the FAA has accomplished many constructive things. Perhaps its greatest accomplishment was in allocating airspace as between military and civilian aircraft. Yet, even before the FAA was many months old, there were indications that the new body was vulnerable in certain areas of its operations. Several courageous Congressmen took note of the danger signals and proposed to take action.

The Brooklyn-Staten Island disaster makes action all the more urgent. The difficult and necessarily slow investigation of this tragedy will probably culminate in Congressional hearings which will undertake to review the adequacy of FAA regulations. Here are some areas that merit close investigation.

1. Why does the FAA have no valid statistics indicating the hazard of mid-air collision? For years its predecessor agency, the Civil Aeronautics Authority, attempted to keep accurate records in this regard. These reports were obtained through the wholehearted cooperation of the pilots who, after all, have more to gain from safe operations than any other group in the world.

Conscientious employees of the old CAA and all the air line pilots knew the value of careful reporting. Each near-accident was analyzed to determine what might be done to prevent a recurrence. Sometimes antiquated regulations were changed. Sometimes airways were moved, better training practices were instituted, or new safety devices were requested. Carefully compiled near-miss reports are vital if we are to minimize the danger of mid-air collisions. They are like a thermometer that points to a fever.

The reports were made possible through the cooperation of the CAA controllers, the Air Line Pilots Association and the individual pilots. This cooperative effort came about because of the CAA's philosophy that the important thing was safety.

Today the FAA statistics would indicate that the near-miss problem has all but vanished. But the air line pilots would violently disagree. Not six months ago, the former chief pilot for one of the major air lines, now regu-

urly flying on the jets, stated unequivcally that the hazard of mid-air collision was never greater. Over a score of qualified pilots were present at that particular gathering. Not one of them disagreed. Equally significant, neither did any of the company's officials present.

The simple fact is that today scarcely anyone connected with commercial aviation will report a near-miss to the FAA. Instead of accepting a near-miss report as a symptom of a dangerous condition, the agency too often regards it as reason for taking action against the parties involved. There have been instances in which individuals have been disciplined for conditions beyond their control: a pilot has been suspended or a controller dismissed when what was really needed was an improvement in training procedures, a reduction of work load, or an improvement in facilities. And, of course, few pilots or controllers want to report a dangerous situation if the only result will be to get a colleague in trouble.

2. Do the FAA's noise-abatement regulations encourage pilots to compromise safety? Ever since the airplane was invented, pilots have been conscious of noise; for years, many of them have participated in voluntary programs to do everything reasonable to reduce it on landing and take-offs. But it has always been well understood that nothing should be done which would compromise safety.

But of late much of the emphasis has changed, due largely, perhaps, to heavy community pressures. In an effort to placate the complainers, the FAA has issued regulations which encourage pilots to follow certain anti-noise traffic patterns even when it might be safer to do otherwise. True, the regulations state that the pilot may still take the safer course of action, but the burden of proof rests on him. If the FAA later rules that he was not justified, he may face suspension of his license.

3. Why are most airports still improperly lighted? In recent years amazing advances have been made in radio facilities. Today the Instrument Landing System makes it possible for a pilot to approach an airport when the ceiling is as low as 200 feet and the visibility restricted to half a mile. But even when he is just off the end of the runway, he sometimes cannot see the airport—particularly at night and in conditions of marginal visibility. Fifteen years ago, the Air Line Pilots Association, the Air Transport Association and other groups began a study to determine the very best airport lighting systems. They came up with recommendations which have since been adopted as standards for the world. Yet here in this country we still have a hodgepodge of lighting systems, some good, most of them inadequate. The FAA has announced that it is going to study the problem anew. It is the feeling of pilots that too much time has been lost already.

4. Why are there still no standardized requirements for copilot training? For years, the Air Line Pilots Association has urged this. While it is true that most air lines now give their copilots adequate training, there are no adequate regulations by which the more short-sighted must abide. Some time ago, the FAA drafted a regulation which would have required copilots to have type-ratings on the planes on which they serve, thus demonstrating that they were fully qualified to take over in the event anything happened to the captain. But after noting protests from a certain segment of the industry, the FAA dutifully watered down the regulation. Today it states merely that all training programs must meet with the approval of the FAA. This is an extremely poor substitute for the original proposal. It opens the door to the possibility of favoritism in the enforcement of none-too- clear training standards. Some air lines may be put to unnecessary expense trying to please a finicky FAA inspector; others, by various means, may be able to skimp where better training should be required. In any case, the regulation fails to provide the public with assurance that all copilots are properly qualified.

Second officers, too, should be properly trained. Today every jet-liner has three pilots in its operating crew. Today's complex jet operations require the full-time attention of two pilots; the third is necessary as a reserve. Here again some air lines have spent thousands of dollars properly training their men. But others attempt to save a few dollars. And in a narrow sense, perhaps they are justified in so doing. For the FAA has not yet recognized the necessity for the third pilot to be properly trained. Regulations state that the captain must be in good physical condition, but they do not take into account the fact that even pilots are subject to heart attacks, sinus trouble or an unpredictable stomach upset.

While the points discussed above do not include all the critical areas that merit attention by Congressional probers of the Brooklyn-Staten Island crash, they are among the more important. On these, and others, there is an abundance of data, much of it provided by C. N. Sayen, President of the Air Line Pilots Association, in evidence before a Senate subcommittee. A year ago, Senators Monroney and Engle and Congressman John Bell Williams proposed that corrective action be taken. Let us hope that it will not require still another catastrophe to bring about that action.

*Karl M. Ruppenthal (center), author of this article, has been an air line captain for TWA since 1942. He is director of Stanford University's Transportation Management Program and a lecturer in transportation and management. Recently, he participated in a program sponsored by the American Arbitration Association and the University of Pennsylvania. With him in this photo are two men distinguished in the field of arbitration, Dave L. Cole (right) and George Taylor (left) who were also at the Association's meeting.*

Special Report:

# Ad Hoc Civil Aviation Meeting

*A large step forward toward establishing standards for flight personnel working conditions on an international basis was made at this eighteen nation meeting in Geneva. This is the report made by C. N. Sayen, president, ALPA, who represented the pilots of the U. S. A. at the International Labor office meeting.*

THE JET AGE has created new problems for flight personnel of the air lines of the world. Aviation is probably the most international of all industries. Flight personnel can cover a dozen countries in a day's work. It is essential that basic standards covering conditions of employment and hours of work and rest periods be established to protect personnel on all international air lines. In the interest of safety basic standards are required and no deviation from these standards permitted for competitive purposes.

### World Aviation Meeting

Last fall representatives of government, employers, and workers from eighteen nations met in Geneva, Switzerland, to study problems in establishing basic standards for flight personnel. They met under the auspices of the International Labor Office, an agency of the United Nations, as a committee called "Ad Hoc Civil Aviation Meeting." Two key items were on the agenda:

1. Review of conditions of employment in civil aviation.

2. Hours of duty and rest periods of flight personnel.

To study the problems the meeting created one large committee which in turn formed three "working" sub-committees—government, employers, and workers. Each group with sixteen members representing nations concerned with civil aviation. (Observers from non-governmental international organizations were also present.) Each subcommittee studied data submitted to it; ultimately it would submit a report of its findings to the main committee.

### U. S. A. Representatives

Secretary of Labor Mitchell and the AFL-CIO appointed the president of ALPA, Clarence N. Sayen, and George Tobias of the Department of Labor as delegates to represent American labor at the Geneva meeting. Claude Smith of the Federal Aviation Agency represented the United States Government. Representing employers were J. L. O'Brien, vice-president of personnel relations of the Air Transport Association, and Everett Goulard, vice-president of Pan American Airways.

When the meeting convened, H. F. Rossetti, representing government of the United Kingdom, was named chairman. Two vice-chairmen were then elected: S. E. Svanberg, representing the employers' group of Denmark, Norway and Sweden, and C. N. Sayen, president of ALPA.

### Issues Involved

Mr. Sayen made this analysis of the accomplishments of the meeting:

"The first important project for the workers' delegation was to attempt to secure a sufficient measure of agreement among all of the workers' delegates present to be able to put forward rational proposals supported by strong arguments that might be accepted by the meeting. When you consider the diversity of the problems under consideration and the variable background of the delegates, it is remarkable the strong agreements which were reached among the workers' representatives on the many agenda items. Resolutions were prepared and agreed on the items under general conditions of service, and a very detailed and comprehensive paper prepared on all aspects of flight hours and rest periods.

### Groups in Accord

"Many people had expected that the workers' delegation would be torn by differences between the pilot groups represented by the International Federation of Air Line Pilots Association and the Civil Aviation Section of the International Transport Workers' Federation. However, in meetings held between representatives of the two groups prior to the beginning of the conference, it became readily apparent that a strong mutual interest existed between the two groups and that alleged differences were more the result of propaganda of some self-serving groups than of real differences over matters of substance.

Mr. D. F. Tennant, General Secretary of the Merchant Navy and Airline Officers Association, United Kingdom, was elected Chairman of the workers' group and Mr. C. N. Sayen as spokesman of the group. Throughout the meeting, there was complete cooperation within the workers' delegation, even throughout the extremely long working hours, the complicated processes which followed, and the many difficult and tedious drafting and redrafting sessions.

### Resolutions Under Study

The first portion of the meeting was devoted to organizing and to a consideration of agenda Item 1, which was the general review of conditions of employment in civil aviation. As this was not a technical agenda item but more in the nature of a general review, it was not expected, under ILO procedures, that technical results would emerge. However, the workers' delegation felt that the conference should express its views or initiate studies in a number of problem areas.

The workers' delegation, therefore, introduced a number of resolutions, nine of which were adopted. **(Resolutions Numbers 2 to 9 listed page 13.)**

### Defining Duty, Rest Periods

The technical agenda item was that of hours of duty and rest periods of flight personnel. This is a very comprehensive and complex subject. The workers' delegation felt that the meeting should adopt a comprehensive paper on this subject dealing with precise definitions and limitations on flight

**Nations attending ILO conference:**

Belgium, Brazil, Canada, Colombia; Denmark, Norway and Sweden, jointly; Australia, France, Republic of Germany, India, Italy, Japan, Mexico, Netherlands, Switzerland, United Kingdom, and the United States.

**Organizations attending:**

International Air Transport Association, International Confederation of Free Trade Unions, International Federation of Air Line Pilots' Associations, International Federation of Christian Trade Unions, International Organization of Employers, International Transport Committee of the International Federation of Christian Trade Unions, International Transport Workers' Federation, and the World Federation of Trade Unions.

RESOLUTION (No. 2) CONCERNING FUTURE ACTION BY THE ILO IN THE FIELD OF CIVIL AVIATION

**The Ad Hoc Civil Aviation Meeting,**

Considering that the ILO exists to provide a forum for dealing with social questions affecting all industrial workers, and

Considering that the civil aviation industry, by reason of its international character and rapid technological development, creates many and varied social problems for the workers employed in it, and

Considering also that these problems are likely to increase in the future,

Recommends to the ILO that it continue to give attention to all such problems by such means as the Governing Body considers appropriate.

RESOLUTION (No. 3) CONCERNING OCCUPATIONAL HEALTH RISKS IN CIVIL AVIATION

**The Ad Hoc Civil Aviation Meeting,**

Having noted with satisfaction the work being done by a variety of bodies in the sphere of aviation medicine as described on page 59 of the General Report on Review of Conditions of Employment in Civil Aviation and,

Recognizing that there is a need for all information which is acquired as a result of this work to be made available to States Members and the employers' and workers' organizations concerned,

Invites the Governing Body to ask the Director-General to consult with the organizations undertaking the work referred to with a view to the co-ordination of the results and to producing a report to be made available to States Members and the employers' and workers' organizations concerned.

RESOLUTION (No. 4) CONCERNING JOINT CONSULTATION IN THE CIVIL AVIATION INDUSTRY

**The Ad Hoc Civil Aviation Meeting,**

Welcomes the existence of collaboration at the company level and/or national level between workers' and employers' organizations, and

Emphasizes the desirability of consultation at the company level and/or national level, according to the practice of the country concerned, upon such subjects as may be agreed between the parties concerned.

RESOLUTION (No. 5) CONCERNING PERSONNEL POSTED ABROAD AND REPATRIATION IN CIVIL AVIATION

**The Ad Hoc Civil Aviation Meeting,**

Recognizing that personnel posted abroad are sometimes affected by different living conditions at their foreign stations, and realizing the need for their eventual return to the home country.

Invited the Governing Body to ask the Director-General to make a study of the questions which may present themselves to the personnel so stationed in relation to:

(a) the social standards they enjoy; and
(b) responsibility for repatriation on termination of service.

RESOLUTION (No. 6) CONCERNING CONDITIONS OF EMPLOYMENT IN AIR NAVIGATION SERVICES

**The Ad Hoc Civil Aviation Meeting,**

Whereas the maintenance of proper standards of air navigation is one of the most important factors in conducting efficient air transport operations, and depends to a considerable degree on the maintenance of the essential navigation services such as traffic control, meteorology, communications and their engineering maintenance,

Invites the Governing Body to ask the Director-General to study the conditions of employment of personnel engaged in air navigation services, with particular reference to the question whether these conditions are such as to attract suitable personnel into these services and to retain them by providing, inter alia, career prospects, thereby achieving efficiency through the adequate manning of the services by fully qualified personnel specializing in the different occupations.

RESOLUTION (No. 7) CONCERNING FINANCIAL SECURITY OF CIVIL AVIATION PERSONNEL

**The Ad Hoc Civil Aviation Meeting,**

1. Civil Liability

Having noted with interest Chapter IX of the Review of Conditions of Employment in Civil Aviation dealing with the subject of the civil liability of air crews,

Having noted also that the Director-General proposes to keep the matter under review in conjunction with his study of liability in all forms of transport,

Invites the Governing Body to request the Director-General in consultation with ICAO to keep this matter under review with the object of ascertaining, within the framework of this general study, how far the employee is protected or may be protected against claims being brought against him or his estate.

2. Air Hostesses

Invites the Governing Body to ask the Director-General to undertake a study of practices in various countries concerning the employment of air hostesses with a view to ascertaining the position both in relation to termination of employment on marriage and on reaching a fixed retirement age.

RESOLUTION (No. 8) CONCERNING CREW HEALTH AND COMFORT ON BOARD AIRCRAFT

**The Ad Hoc Civil Aviation Meeting,**

Recognizing that, for flight personnel, an aircraft represents their total working environment during flight time,

Invites the Governing Body of the ILO to ask the Director-General to request ICAO to continue to give consideration to the working environment of flight personnel on board aircraft in connection with any ICAO study of related technical and operational problems which may be undertaken.

RESOLUTION (No. 9) CONCERNING THE EFFECTS OF TECHNOLOGICAL CHANGE IN THE CIVIL AVIATION INDUSTRY

**The Ad Hoc Civil Aviation Meeting,**

Recognizing the rapid technological progress in the aviation industry, and the adjustments thereby required of personnel, and the difficulties that such personnel may encounter when seeking to utilize their specialized skills and qualifications in other industries, and the high medical standards required of some categories of personnel,

Invites the Governing Body to request the Director-General of the International Labour Office to undertake studies of procedures whereby flight or ground personnel, who by loss of license or by technological development in the industry have been prevented from performing the work for which they have been engaged, may be provided with alternative employment based upon restraining in accordance with their skills and qualifications, either in the air or on the ground or with financial compensation determined in accordance with the normal negotiating practice in the industry.

time, duty time, rest periods, and conditions of service and a comprehensive paper on this subject was agreed on within the workers' delegation. The workers' representatives felt that even if such a paper was not adopted in its entirety, it would prove an invaluable guide for representatives of flight personnel throughout the world for many years in their legislative or industrial processes within their own country.

If such precise and comprehensive definitions and limits could not be agreed by the meeting, it would, nevertheless, be valuable to have similar definitions and concepts adopted by the ILO so that such guidance would be available to governments, employers, and employees in civil aviation.

At the outset, the employers objected to any comprehensive or precise treatment of this subject, contending that the jurisdiction over any international regulations dealing with minimum standards for safety lies with ICAO and that the ILO could only deal with social and industrial conditions. However, after considerable discussion of the subject, the employers introduced a paper dealing with the subject in general terms.

## Government Sides With ICAO

It is presumptive to attempt to set forth the precise position of the Government representatives since they tend to approach the problems individually and are not as prone to take positions as a group as the employer and worker representatives. Generally, however, the position of the government delegations was that the responsibility for establishing minimum international standards for safety dealing with flight time, duty time, and rest periods lies with ICAO but that employees and employers or governments were free to adopt such standards in excess of the minimums for social and industrial purposes as they desired and that a minimum safety standard might not represent an acceptable social and industrial standard.

In general, the Government delegates felt that this ad hoc meeting should not attempt to establish precise mathematical limitations but should establish general concepts and definitions within which the precise limitations could be determined by the processes available within each country. So it was obvious that if some agreement could be achieved in general areas, it would be of value.

## Subcommittees Final Report

The plenary session proceeded then

## Ad Hoc Civil Aviation Meeting (Continued)

*Mr. C. N. Sayen (second from left) represented American pilots at the meeting.*

to create a subcommittee on this subject. The subcommittee created a working group, and after many long hours, a draft resolution was reported to the plenary session, after some amendment, was adopted by a combination of votes between the worker and government delegations. (See Conclusions Numbers 1 to 17 below.)

* * *

CONCLUSIONS (No. 1) CONCERNING HOURS OF DUTY AND REST PERIODS OF CREW MEMBERS IN CIVIL AVIATION

**The Ad Hoc Civil Aviation Meeting of the International Labour Organization:**

Recognizing that, in the determination of hours of duty and rest periods in civil aviation, account should be taken of technical, safety, economic and social factors;

Recognizing that the International Civil Aviation Organization has adopted standards for application by its member states concerning the safety, regularity and efficiency of international air navigation, including a standard and guidance material on the limitations of the flight time of flight crew members, and that the International Civil Aviation Organization is actively pursuing the adoption of further standards and recommended practices in respect of safety;

Recognizing that, for social considerations, it is also appropriate to adopt flight and duty time limitations and minimum rest periods;

Recognizing that detailed provisions to this end should be established on a national or an individual airline basis;

Pursuant to this social objective, adopts the following Conclusions:

**Scope**

1. The provisions below should apply to all crew members engaged in commercial air transport (operations such as executive flying, agricultural, health, survey, etc., are not included in this context) whose normal duties include assignment on board an aircraft during flight time.

**Hours of Duty and Flight Time**

2. There should be limitations on the flight time and the duty time of crew members engaged in commercial air transport. Such limitations should provide for at least a weekly, monthly or quarterly limitation, or a combination of these, as may be appropriate to the operational conditions.

3. Where, as a result of operational considerations, extended duty periods are required, sufficient crew members should be carried so as to insure avoidance of an undue individual workload.

**Rest Periods**

4. Minimum rest periods should be established into account relevant factors such as the duration of the immediately preceding and the succeeding duty times.

5. Minimum uninterrupted periods free of all duty should be granted to crew members at their home base after a series of flights.

6. Rest facilities both in flight and on the ground should be such as to insure adequate rest appropriate to the circumstances of the operation.

**Methods of Application of Provisions**

7. Limitations on hours of flight and hours of duty and provisions for rest periods should be determined between employers' and workers' organizations, or in accordance with national practice, as may be appropriate.

8. Such limitations should be determined with due regard to operational, economic and social considerations.

9. The limits of hours or minimum rest periods should be such as to insure that

(1) the total hours of duty of crew members, averaged over the period appropriate to the operational requirements, are comparable with those current in the majority of other occupations in the country concerned.

(2) crew members enjoy periods of leisure and social conditions such as normal as the circumstances of their occupation permit.

10. Principles for the determination of duty rosters should be established in consultation with the representatives of the crew members concerned.

**Supervision of the Practical Implementation of Provisions**

11. Records of flight and duty time should be kept by operators and should be available for inspection by the appropriate national authorities.

12. Crew members should not carry out flights for another employer if this leads to the prescribed standards being exceeded.

**Joint Consultation**

13. The framing and application of any provisions mentioned in these conclusions should be the subject of consultation between the employers' and workers' organizations concerned.

**Definitions**

**Flight Time**

14. The total time from the moment an aircraft first moves under its own power for the purpose of taking off until the moment it comes to rest at the end of the flight.

NOTE: Flight time as here defined is synonymous with the term "block to block" time or "chock to chock" time in general usage which is measured from the time the aircraft moves from the loading point until it stops at the unloading point.

**Hours of Duty**

15. Any time during which a crew member is performing an activity assigned to him by an operator.

NOTE: The word "activity" is understood, in the social context, to include time on standby duties and waiting periods in connection with any assignment at places where no adequate rest facilities are available to the crew members.

**Rest Period**

16. A period of time during which a crew member is not assigned any functions by his employer.

**Safeguarding Clause**

17. None of the provisions of the present conclusions should be used to seek the amendment or review of any law, regulation, award, custom or agreement between employers and workers which insures more favorable conditions to the workers.

### Accomplishments of Meeting

It is not known at this time whether, despite the resolution adopted recommending it, the Governing Body of the ILO will decide to hold further civil aviation meetings or consider the establishment of an aviation commission of the ILO. It is worthwhile, however, to attempt to evaluate the results achieved by the recent meeting.

It seems that: (1) a valuable forum was provided for discussion and review of international aviation problems by all interested government, employer, and employee groups and, most certainly, a greater measure of understanding was achieved between the various employee groups in civil aviation throughout the world and with employer and government delegations. (2) Comprehensive studies on the conditions of employment in civil aviation and hours of duty and rest periods have been produced and will provide invaluable reference material to all those interested for many years. (3) Programs pursued through the national processes of each country by employees, employers, and governments should be of greater uniformity because of the

exchange of ideas and the agreement on certain concepts. (4) Specific resolutions were adopted which will provide guidance material for governments, employees, and employers to utilize within their own national processes. (5) The discussions held, agreements reached, and understandings achieved within the workers' delegations will not only leave a better understanding between them for many years but will be of help to them in processing future problems.

There was a conscientious attack by all present on the problems with everyone working practically around the clock and emerging tired after two weeks of concentrated effort. It is a compliment to the organization and efficiency of the ILO Secretariat and staff, interpreters and others, that such diverse groups can be brought together, introduced to the complicated processes utilized for such meetings and still produce efficient results. It is also interesting to note that people working in aviation throughout the world have such a strong affinity of interest that despite their differences of background, language or self-interest, they come to 'speak the same language' very quickly.

## *An Urgent Need . . .*

*Continued from page 10*

cal devices, have a similar responsibility to *insist* on a statement of operational requirements.

Working together in this fashion, the job can be accomplished. The Air Traffic Control Association, the professional society of controllers (and incidentally, we are extremely proud to number engineers, pilots and many major electronic and aviation corporations among our membership!), has undertaken a project to make these operational requirements available. We do not imply that we will perform this monumental task alone. We simply hope to take our place on the team, and in so doing, provide an ingredient that has been conspicuously lacking throughout the years.

We are calling this effort "Project 2000" and there is some very real significance in that figure "2000." If we continue to simply add "black boxes" upon "black boxes," with little regard for operational requirements, and without the slightest vestige of an over-all plan, we will *never* have an effective air traffic control system. Pursuing such a course, we can anticipate by the year 2000, an even more hopeless snarl of air traffic than we are presently experiencing with automobiles on the ground. I am confident that requirements *can* be stated, understood, and agreed upon, and though many of us will never see the year 2000, it is a project that should commend itself to all engineers, pilots and controllers.

"Project 2000" calls for an analysis of each critical element of an effective air traffic control system: communications, data gathering, data processing, data display and coordination. With the help of the engineers, and the active participation of pilots, we propose to assemble these operational requirements, and present them in such a manner that an over-all plan can be formulated, and a true *system* of air traffic control developed.


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**SERVING AIR LINE PILOTS SINCE 1937**

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***Attention, Flight Personnel!***

# be an absentee businessman

**. . . open a Philco-Bendix self-service laundry store**

Many airline pilots, co-pilots, engineers and stewards are going into the self-service coin-operated laundry business. These new stores are made to order for absentee ownership and are hard to beat for fast returns on a small capital investment.

**Here are some of the facts:** A coin-operated laundry needs no attendant. Customers simply come into the store, wash and dry their clothes in metered machines and leave. Only a few hours a week are required to empty coin boxes and supervise efficient operation.

**Coin stores are outstandingly successful** because they offer customers up to a 65% saving over attended-type wash-and-dry service. They are convenient for busy people because they remain open 24 hours a day, seven days a week. There are no credit problems – *it's strictly a cash business.*

**Act now!** Send coupon below for complete data on business locations in your area and valuable help in all phases of planning, financing and promoting a coin-operated laundry store that will work for you round the calendar.

PHILCO BENDIX **COMMERCIAL LAUNDRY SALES**

Philco-Bendix Commercial Laundry Equipment is brought to you by Philco Corporation

**PHILCO CORPORATION**
**Commercial Laundry Adv. Dept. AP-9**
**Tioga and C Streets, Philadelphia 34, Pa.**

Please send me information on Philco-Bendix Commercial Washers . . . also the name of my local distributor.

Name_____

Address_____

City_____ Zone____ State_____

## *Airline Emblems . . . Does Yours Appear Here?*

**The emblems above represent 32 Airlines whose ALPA Pilots are members of the Airline Pilots Occupational Disability Insurance* Plan.**

## $25,000 Airline Pilot Occupational Disability Insurance*

**(Cash, Tax Free — Non-Cancellable to Age 60)**

**This insurance will pay a pilot $25,000. cash, tax free, if he is permanently prevented from flying for his airline for physical reasons.**

**ELIGIBILITY:**

- **If you have been employed less than 2 years you are eligible to join without a physical examination.**
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  **Aviation Insurance Agency, Inc.**
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  **P.O. Box 31, Islington, Ontario**
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- **American**
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